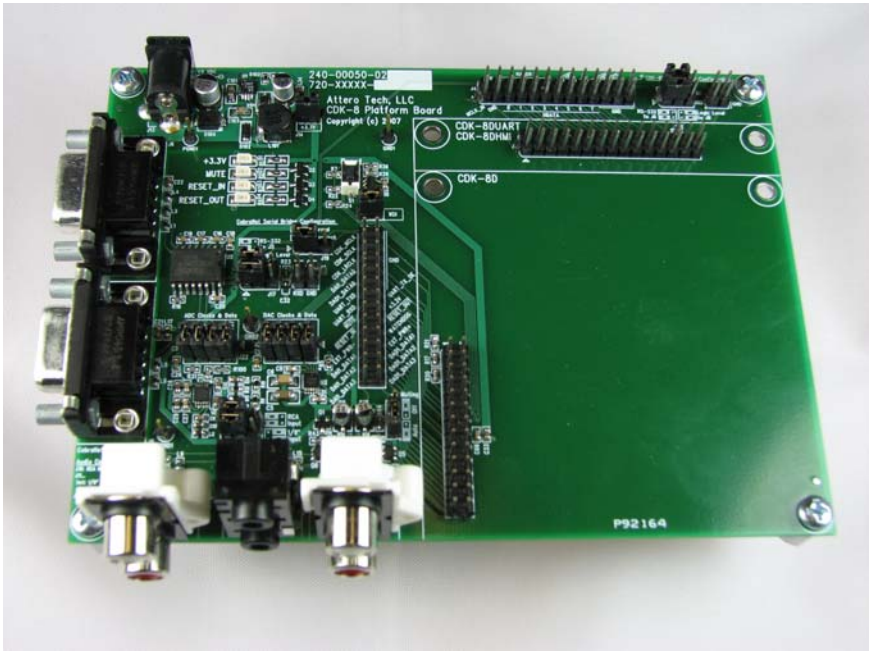
CDK-8 Platform Board

CDK-8 and CobraNet Evaluation Board



User Manual

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614-00003-03

IMPORTANT SAFETY INSTRUCTIONS

The symbols below are internationally accepted symbols that warn of potential hazards with electrical products.

This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure -- voltage that may be sufficient to constitute a risk of shock.

This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

1) Read these instructions.
2) Keep these instructions.
3) Heed all warnings.
4) Follow all instructions.
5) Do not use this apparatus near water.
6) Clean only with a dry cloth.
7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
10) Only use attachments/accessories specified by Attero Tech.
11) Unplug this apparatus during lightning storms or when unused for long periods of time.
12) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
13) This apparatus shall be connected to a mains socket outlet with a protective earthing connection.
14) When permanently connected, on all-pole mains switch with a contact separation of at least 3mm in each pole shall be incorporated in the electrical installation of the building.

WARNING -- TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

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1 – Overview

The Attero Tech CDK-8 Platform Board allows for evaluation of the Attero Tech family of CDK-8 modules. This platform board incorporates a switching power regulator, a stereo DAC, a stereo ADC, a watchdog timer, and an RS-232 line driver/receiver. It provides power to a CDK-8 module as well as audio jacks, serial ports, and headers for access to critical signals. An Attero Tech CDK-8D, CDK-8DHMI, or CDK-8DUART module is required for operation of the Platform Board. With a CDK module properly installed, the assembly resembles the functionality of the Attero Tech CO2.

1.1 – Block Diagram

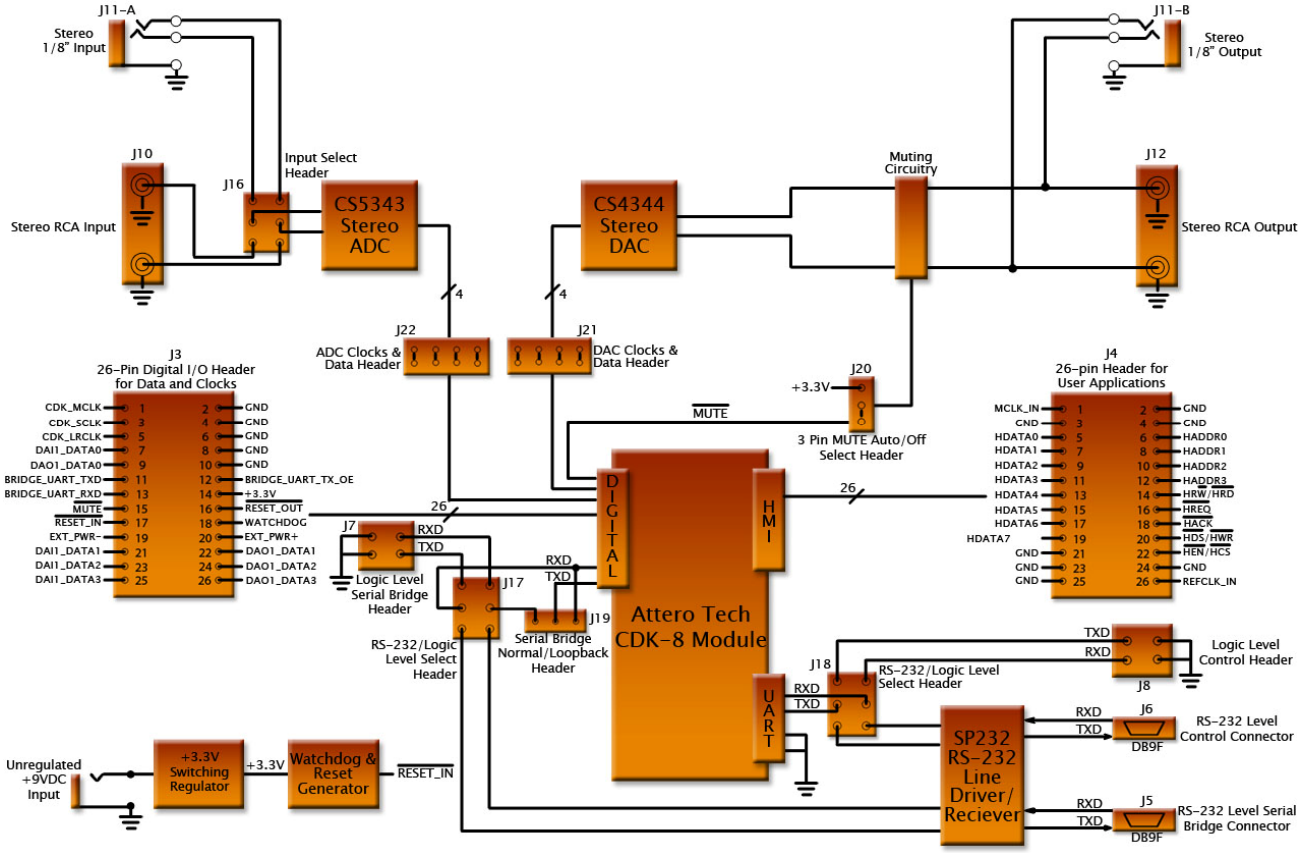


Figure 1 - CDK-8 Platform Board Block Diagram

2 – Hardware

Refer to the PCB silkscreen in section 4.2.1 to locate the various headers and connectors. The schematic in section 3.4.4A1 provides the pin arrangement for all headers.

**Note:* In the following pin-out tables, if the pin name is preceded by a backslash then the signal uses negative true logic.

2.1 – Setup

First make sure a CDK-8D, CDK-8DHMI, or CDK-8DUART module is properly installed. To install a CDK-8 module on the platform board, first power off the board, line up the pin 1 indicators (indicated by a triangle, dot, or indentation) for J1 and J2 (if applicable), and then firmly push it straight down. Next, refer to section 2.3 and install the appropriate jumpers depending on your desired configuration. Finally, connect your audio jacks and power up the board using the provided power supply.

*Note: If a CDK-8 module needs to be removed from a Platform Board for any reason, use caution so as to not bend the pins on J1 or J2.

2.2 – I/O Headers

All I/O headers on the platform board are spaced on 0.1" centers and are standard square pin headers. Signal directions are relative to the CDK-8 module.

J1: CDK-8 Module Digital Audio I/O Header

This header is utilized by all CDK-8 modules.

Pin	Signal Name	Direction	Function
1	CDK_MCLK	Out	Master Audio Clock
2	GND	-	Digital Ground
3	CDK_SCLK	Out	Audio Bit Clock
4	GND	-	Digital Ground
5	CDK_LRCLK	Out	Sample Clock
6	GND	-	Digital Ground
7	DAI1_DATA0	In	Digital Audio Input Data 0
8	GND	-	Digital Ground
9	DAO1_DATA0	Out	Digital Audio Output Data 0
10	GND	-	Digital Ground
11	BRIDGE_UART_TXD	Out	CobraNet Serial Bridge Asynchronous Transmit Data
12	BRIDGE_UART_TX_OE	Out	CobraNet Serial Bridge Transmit Drive Enable
13	BRIDGE_UART_RXD	In	CobraNet Serial Bridge Asynchronous Receive Data
14	+3.3 V	In	+3.3 V for CDK-8 Module
15	\MUTE	Out	Interface Ready
16	\RESET_OUT	Out	Reset Out
17	\RESET_IN	In	External Reset In
18	WATCHDOG	Out	Watchdog
19	EXT_PWR-	Out	External Power –
20	EXT_PWR+	Out	External Power +

21	DAI1_DATA1	In	Digital Audio Input Data 1
22	DAO1_DATA1	Out	Digital Audio Output Data 1
23	DAI1_DATA2	In	Digital Audio Input Data 2
24	DAO1_DATA2	Out	Digital Audio Output Data 2
25	DAI1_DATA3	In	Digital Audio Input Data 3
26	DAO1_DATA3	Out	Digital Output Data 3

Table 1 – CDK-8 Module Digital I/O Header Pin-Out

J2: CDK-8 Module HMI & UART Header

This header is not used with a CDK-8D module installed. Pins 1-26 are utilized for a CDK-8DHMI module, whereas pins 1-4 and 27-30 are utilized for the CDK-8DUART module.

Pin	Signal Name	Direction	Function
1	MCLK_IN	In	Master Audio Clock Input
2	GND	-	Digital Ground
3	GND	-	Digital Ground
4	GND	-	Digital Ground
5	HDATA0	In/Out	Host Port Data bit 0
6	HADDR0	In	Host Port Address bit 0
7	HDATA1	In/Out	Host Port Data bit 1
8	HADDR1	In	Host Port Address bit 1
9	HDATA2	In/Out	Host Port Data bit 2
10	HADDR2	In	Host Port Address bit 2
11	HDATA3	In/Out	Host Port Data bit 3
12	HADDR3	In	Host Port Address bit 3
13	HDATA4	In/Out	Host Port Data bit 4
14	HR\W \HRD	In In	Host Port Transfer Direction (Motorola) Host Read (Intel)
15	HDATA5	In/Out	Host Port Data bit 5
16	\HREQ	Out	Host Port Data Request
17	HDATA6	In/Out	Host Port Data bit 6
18	\HACK	Out	Host Port Interrupt Request
19	HDATA7	In/Out	Host Port Data bit 7
20	\HDS \HWR	In In	Host Strobe (Motorola) Host Write (Intel)
21	GND	-	Digital Ground
22	\HEN \HCS	In In	Host Enable (Motorola) Host Select (Intel)
23	GND	-	Digital Ground
24	GND	-	Digital Ground
25	GND	-	Digital Ground
26	REFCLK_IN	In	Reference Clock
27	CTRL_UART_RXD	In	CDK-8DUART Control Asynchronous Receive Data
28	CTRL_UART_TXD	Out	CDK-8DUART Control Asynchronous Transmit Data
29	GND	-	Digital Ground
30	GND	-	Digital Ground

Table 2 – CDK-8 Module HMI & UART Header Pin-out

J3: User Digital I/O Header

This header has an identical pin-out to J1 and allows the user to access the signals in Table 3 below.

Pin	Signal Name	Direction	Function
1	CDK_MCLK	Out	Master Audio Clock
2	GND	-	Digital Ground
3	CDK_SCLK	Out	Audio Bit Clock
4	GND	-	Digital Ground
5	CDK_LRCLK	Out	Sample Clock
6	GND	-	Digital Ground
7	DAI1_DATA0	In	Digital Audio Input Data 0
8	GND	-	Digital Ground
9	DAO1_DATA0	Out	Digital Audio Output Data 0
10	GND	-	Digital Ground
11	BRIDGE_UART_TXD	Out	Asynchronous Transmit Data
12	BRIDGE_UART_TX_OE	Out	Transmit Drive Enable
13	BRIDGE_UART_RXD	In	Asynchronous Receive Data
14	+3.3 V	In	+3.3 V for CDK-8 Module
15	\MUTE	Out	Interface Ready
16	\RESET_OUT	Out	Reset Out
17	\RESET_IN	In	External Reset In
18	WATCHDOG	Out	Watchdog
19	EXT_PWR-	Out	External Power –
20	EXT_PWR+	Out	External Power +
21	DAI1_DATA1	In	Digital Audio Input Data 1
22	DAO1_DATA1	Out	Digital Audio Output Data 1
23	DAI1_DATA2	In	Digital Audio Input Data 2
24	DAO1_DATA2	Out	Digital Audio Output Data 2
25	DAI1_DATA3	In	Digital Audio Input Data 3
26	DAO1_DATA3	Out	Digital Audio Output Data 3

Table 3 – User Digital I/O Header Pin-out

J4: User HMI Header

This header has an identical pin-out to J1 for pins 1-26 and allows the user to access the signals in Table 4 below.

Pin	Signal Name	Direction	Function
1	MCLK_IN	In	Master Audio Clock Input
2	GND	-	Digital Ground
3	GND	-	Digital Ground
4	GND	-	Digital Ground
5	HDATA0	In/Out	Host Port Data bit 0
6	HADDR0	In	Host Port Address bit 0
7	HDATA1	In/Out	Host Port Data bit 1
8	HADDR1	In	Host Port Address bit 1
9	HDATA2	In/Out	Host Port Data bit 2
10	HADDR2	In	Host Port Address bit 2
11	HDATA3	In/Out	Host Port Data bit 3
12	HADDR3	In	Host Port Address bit 3
13	HDATA4	In/Out	Host Port Data bit 4
14	HR\W \HRD	In In	Host Port Transfer Direction (Motorola) Host Read (Intel)
15	HDATA5	In/Out	Host Port Data bit 5
16	\HREQ	Out	Host Port Data Request
17	HDATA6	In/Out	Host Port Data bit 6
18	\HACK	Out	Host Port Interrupt Request
19	HDATA7	In/Out	Host Port Data bit 7
20	\HDS \HWR	In In	Host Strobe (Motorola) Host Write (Intel)
21	GND	-	Digital Ground
22	\HEN \HCS	In In	Host Enable (Motorola) Host Select (Intel)
23	GND	-	Digital Ground
24	GND	-	Digital Ground
25	GND	-	Digital Ground
26	REFCLK_IN	In	Reference Clock

Table 4 – User HMI Header Pin-out

J7: Logic Level CobraNet Serial Bridge Header

This header is only functional when J17 is configured for logic level operation.

Pin	Signal Name	Direction	Function
1	BRIDGE_UART_RXD	In	CobraNet Serial Bridge Asynchronous Receive Data
2	BRIDGE_UART_TXD	Out	CobraNet Serial Bridge Asynchronous Transmit Data
3	GND	-	Digital Ground
4	GND	-	Digital Ground

Table 5 – Logic Level CobraNet Serial Bridge Header Pin-out

J8: Logic Level CDK-8DUART Control Header

This header is only functional when J18 is configured for logic level operation.

Pin	Signal Name	Direction	Function
1	CTRL_UART_RXD	In	CDK-8DUART Control Asynchronous Receive Data
2	CTRL_UART_TXD	Out	CDK-8DUART Control Asynchronous Transmit Data
3	GND	-	Digital Ground
4	GND	-	Digital Ground

Table 6 – Logic Level CDK-8DUART Control Header Pin-out

2.3 – Configuration Headers

All configuration headers on the platform board are spaced on 0.1" centers and are standard square pin headers with shunts supplied.

J14: +3.3 V Header

With a shunt installed on J14 the switching power supply is connected to the +3.3 V net on the platform board. Uninstalling this shunt allows the connection of an ammeter for current measurements or a third party power supply. If using a third party power supply and bypassing the switching regulator, connect '–' to the pin labeled GND1 and connect '+' to the right-most pin of this header. This shunt is normally installed.

J15: WDI Header

With a shunt installed on J15, the WATCHDOG signal of the CDK-8 module is connected to the WDI pin of the watchdog circuitry on the platform board. Uninstalling this shunt disables the watchdog functionality and, if required, the module will have to be reset manually by pressing S1. This shunt is normally installed.

J17: CobraNet Serial Bridge RS-232/Logic Level Select Header

This header selects between RS-232 or logic level CobraNet Serial Bridge operation. Follow the PCB silkscreen directions to route signals to either J5 or J7. These shunts are normally in RS-232 mode.

J18: CDK-8DUART Control RS-232/Logic Level Select Header

This header selects between RS-232 or logic level CDK-8DUART Control operation. Follow the PCB silkscreen directions to route signals to either J6 or J8. These shunts are normally in RS-232 mode.

J19: CobraNet Serial Bridge Normal/Loopback Mode Select Header

With the shunt in normal mode, the CobraNet Serial Bridge operates unaltered. Normal mode allows full-duplex serial data communication from one CobraNet device to another. With the shunt in loopback mode, the signals BRIDGE_UART_TXD and BRIDGE_UART_RXD are connected together. Placing one CobraNet device in loopback mode allows data transmitted by another CobraNet device in normal mode to travel over the network and subsequently be echoed back, thus verifying serial bridge connectivity. Follow the PCB silkscreen directions for desired shunt placement. This shunt is normally in Normal mode.

J20: Muting Select Header

With the shunt in automatic mode, the DAC outputs will be muted when the \MUTE signal is asserted. With the shunt in off mode, the DAC outputs are never muted. Follow the PCB silkscreen directions for desired shunt placement. This shunt is normally in Auto mode.

J21: DAC Clocks & Data Header

With all four shunts installed vertically, the master clock, bit clock, frame clock, and serial data input are connected directly to the DAC for normal operation. The top row of header pins are signals from the CDK-8 module whereas the bottom row connects to the DAC. These four shunts are normally installed.

J22: ADC Clocks & Data Header

With all four shunts installed vertically, the master clock, bit clock, frame clock, and serial data output are connected directly to the ADC for normal operation. The top row of header pins are signals from the CDK-8 module whereas the bottom row connects to the ADC. These four shunts are normally installed.

2.4 – Connectors

These connectors provide connectivity to external components.

J5: RS-232 CobraNet Serial Bridge

This DB9F connector allows a user's computer to connect to the CobraNet Serial Bridge using a standard 9-pin serial cable. J5 is only active when J17 is configured for RS-232 operation.

J6: RS-232 CDK-8DUART Control

This DB9F connector allows a user's computer to connect to the CDK-8DUART Control using a standard 9-pin serial cable. J6 is only active when J18 is configured for RS-232 operation and a CDK-8DUART module is installed.

J10: RCA Stereo Audio Input

This connects to the stereo ADC. J10 is only functional when J16 is configured for RCA input.
White: Left Audio Channel Input
Red: Right Audio Channel Input

J11-A (bottom): 1/8" (3.5 mm) Stereo Audio Input

This connects to the stereo ADC. J11-A is only functional when J16 is configured for 1/8" input.
Tip: Left Audio Channel Input
Ring: Right Audio Channel Input
Sleeve: Audio Ground

J11-B (top): 1/8" (3.5 mm) Stereo Audio Output

This connects to the stereo DAC.
Tip: Left Audio Channel Output
Ring: Right Audio Channel Output
Sleeve: Audio Ground

J12: RCA Stereo Audio Output

This connects to the stereo DAC.
White: Left Audio Channel Output
Red: Right Audio Channel Output

J13: +9 VDC Input

Unregulated
2.1mm plug with center pin positive
500 mA (recommended)

2.5 – LEDs

These LEDs provide a visual status of various signals.

Ref.	Connected to	Color	Function
D1	+3.3 V	Green	Indicates that the platform board power supply is operational.
D2	\MUTE	Red	Indicates that the installed CDK-8 module interface is not ready.
D3	\RESET_IN	Red	Indicates that a reset signal has been asserted by either pressing the reset switch or by the watchdog circuitry if the WDI shunt is installed.
D4	\RESET_OUT	Red	Indicates that the installed CDK-8 module is resetting.

Table 7 – CDK-8 Platform Board LEDs

2.6 – Reset Switch

This switch forces a reset of the installed CDK-8 module. Pressing it asserts the \RESET_IN signal and illuminates D3. If the CDK module is correctly installed, the module is reset and as a consequence asserts the \RESET_OUT signal causing D4 to illuminate. If D4 does not illuminate, make certain that the CDK has been installed properly.

3 – Software

3.1 – Requirements

Microsoft Windows 2000 or Windows XP *
SNMP services installed and running

3.2 – Installation

All installation files are included on the CD packaged with the system. To install the software on your machine simply run the setup.exe file located on the CD-ROM.

The installation will create a program group and a shortcut to the program. This is located under: *Start Menu—All Programs—CobraNet CO2—CO2 Demonstration Utility*.

3.3 – Setup

The software requires the presence of at least one CobraNet device on the network to operate and at least two to have meaningful CobraNet functionality. It is recommended that an independent isolated network be used for demonstrating CobraNet devices to eliminate network traffic issues.

First, connect your computer to a 10/100 Fast Ethernet switch and assign your network adapter a static IP address. This is done by right-clicking the network adapter in the Network Connections control panel and editing its TCP/IP properties.

Next, power up each CobraNet device and connect them to the same switch using CAT-5 Ethernet patch cables. Launch the *CO2 Demonstration Utility* and verify that the network adapter connected to the CobraNet network is selected. The software will now automatically detect and assign IP addresses for each CobraNet device. Select a unique CobraNet device for "Device 1" and "Device 2" through the "IP Address" drop-down box and press the corresponding "Find" button. The device names and attributes will appear and the software utility can now be used to control each device.

3.4 – Software Interface

The *CO2 Demonstration Utility* is divided into four pages selected by the tabs on top:
Audio Signal Routing
Bundle Routing
Serial Bridge
Discovery Options

* At time of writing, the software does not work without modification under Windows Vista. Running the application in XP-compatible mode and with administrative privileges can, in some cases, get the application to operate. However, no guarantees to its operation can be given if used in this manner.

3.4.1 – Audio Signal Routing

This page handles the majority of the CobraNet device monitoring and control. This page is divided vertically into two sections of identical controls for each device. This allows the user to monitor and control each CobraNet device simultaneously. Figure 2 labels each control and control section with a letter and each one is described in this section.

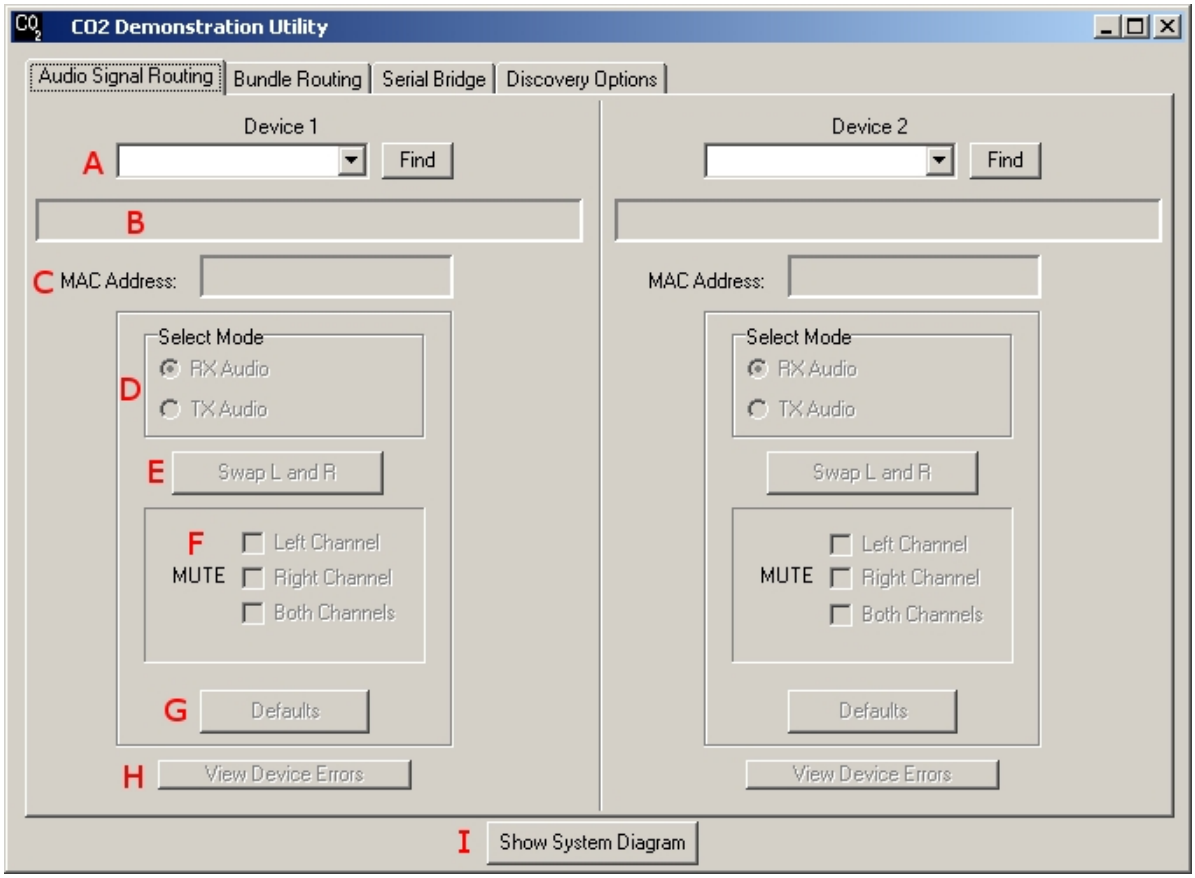


Figure 2 - Audio Signal Routing page of the CO2 Demonstration Utility

A – IP Address Drop Down Box & Find Button

CobraNet devices are automatically discovered and assigned IP addresses by the application. Once a device has been discovered it is added to the list for each drop down box. By selecting a device from the list and pressing the corresponding "Find" button, the device information is gathered and populates the controls. It is important to note that most of the controls in the application are disabled until a valid CobraNet device is loaded.

B – Description Box

This is a read only field that displays the device name.

C – MAC Address Box

This displays the MAC address for the currently selected device.

D – Select Mode

This section allows the user to specify how the device is currently connected in the system. When in RX mode the device is receiving audio from the network and connected to an audio output source. In TX mode, the device is transmitting audio to the CobraNet network and an audio source is connected to the device. The System Diagram is helpful in determining how your system should be set up.

E – Swap L and R Button

This is an audio routing function and issues a command to the CobraNet device to swap the left and right audio channels.

F – Mute Selection
Audio channels can be muted individually by checking each channel's corresponding checkbox.

G – Defaults Button
This button loads the default factory settings preloaded in each CobraNet device. This is useful if your device has become unstable. This function also resets the software interface, if for example, the connection to the device was lost and parameters were changed in the software without updating the device.

H – View Device Errors Button
This button opens a new window that displays the error count and last error code. This is useful for troubleshooting a device or monitoring the performance of a device on the current network setup.

I – Hide/Show System Diagram
A graphical depiction of the current CobraNet system is displayed and updated in the System Diagram. This is a helpful tool in demonstrating the relationship between the software, hardware, and CobraNet capabilities. Pressing the Show/Hide button allows the user to display or hide the picture in Figure 3.

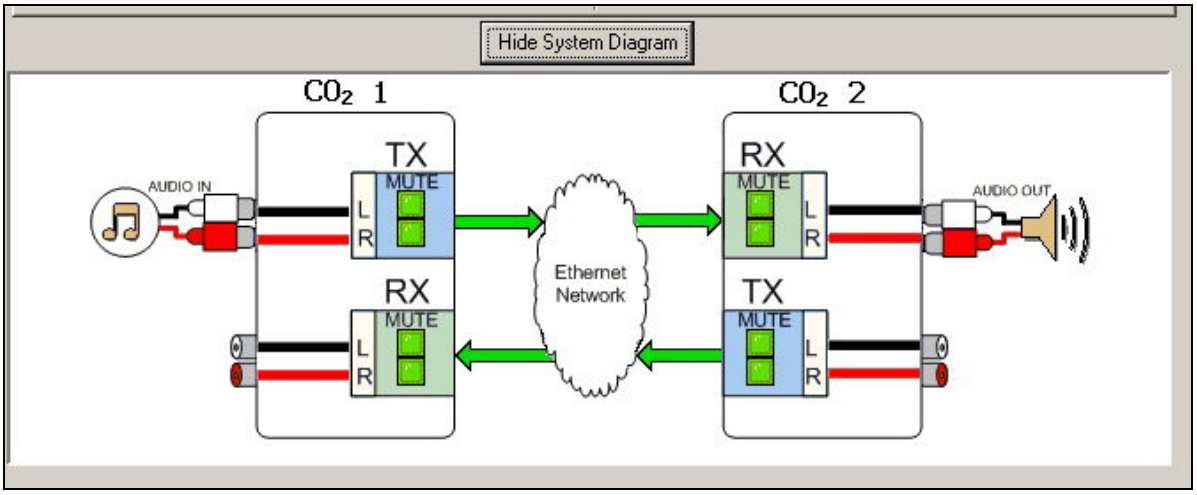


Figure 3 - System Diagram of the CO2 Demonstration Utility

3.4.2 –Bundle Routing

The previous page dealt with routing audio signals on the CobraNet network. This cannot be accomplished without first designating bundle assignments. Each CobraNet device transmits audio channels in bundles over the network. Each bundle is capable of transmitting up to eight channels. The CobraNet processor used in the device determines the total number of channels. In order for transmission to occur, a transmitter must have a matching receiver. In the case of the CO2, the devices are capable of only stereo audio. Therefore, audio is only transmitted in the first TX/RX bundle, TX1/RX1.

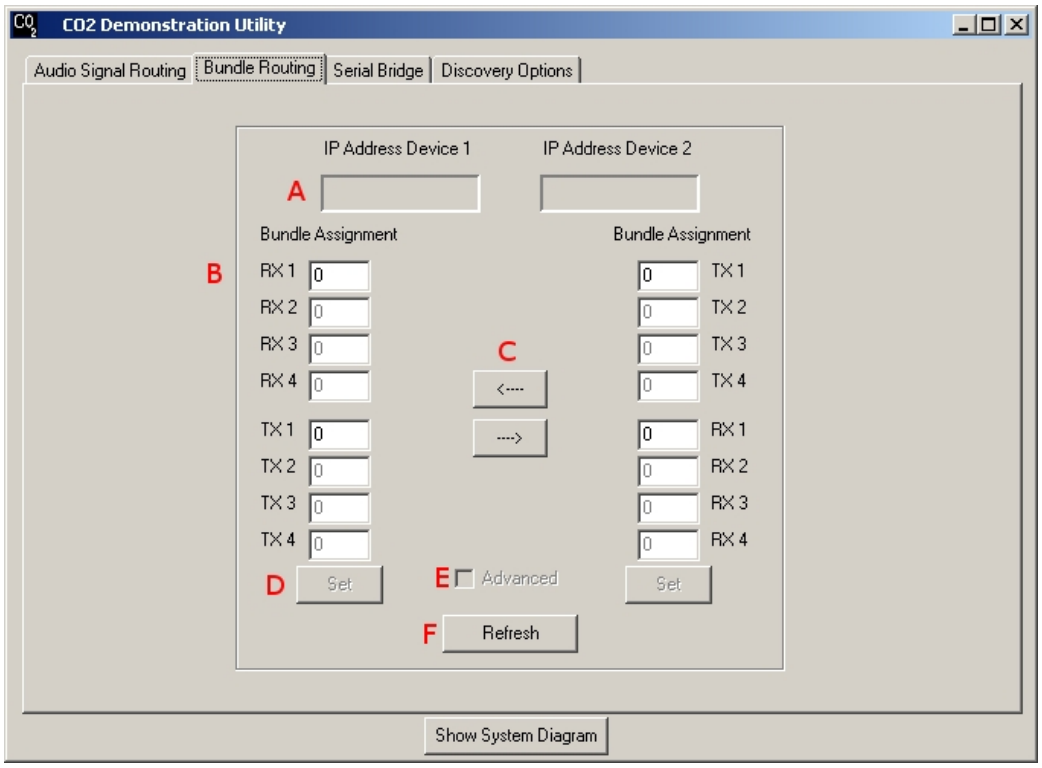


Figure 4 - Bundle Routing page of the CO2 Demonstration Utility

A – IP Address Boxes

Displays the current IP address of the device being monitored.

B – Bundle Assignment Edit Boxes

Bundles numbers are assigned in these edit boxes. The numbers indicate the current bundle assignments for the labeled box.

C – Copy Buttons

These buttons provide an easy way to populate each bundle assignment box by copying the bundle assignments of one device into the assignment boxes for the other device.

D – Set Button

Changing a bundle assignment does not take effect until the Set button is pressed. When pressed, it assigns the value of each box to the corresponding device.

E – Advanced Checkbox

As discussed earlier, the CO2 only contains an audio signal in the first transmitter. However, other devices can have up to four transmitters and receivers. By clicking on the advanced checkbox the other bundle assignment edit boxes are enabled in the event that the software is controlling a device other than a CO2.

F – Refresh Button

This is used to read the current status of each bundle for both devices. Use this button if the bundles assignment boxes were edited but not assigned by pressing the Set button.

Bundles can be assigned numbers from 0 through 65535. However, there are designations for certain ranges shown in Table 8 below.

Bundle #	Type	Usage
0	Null	Disables transmission
1 to 255	Multicast	One to many transmission, not recommended for most applications as it will add high network traffic
256 to 65279	Unicast	Typical mode for transmission, 1 receiver for each transmitter
65280 to 65535	Private	Unique to a transmitter's MAC address

Table 8 – CobraNet Bundle Types

3.4.3 – Serial Bridge

This page is used to demonstrate the serial bridging capability of the CobraNet technology. Users must connect the DB9 serial cable to the serial port of their computer and to the DB9 connector on one CDK-8 Platform Board or CO2. On the opposite CobraNet device, place an appropriate shunt to enable loopback.

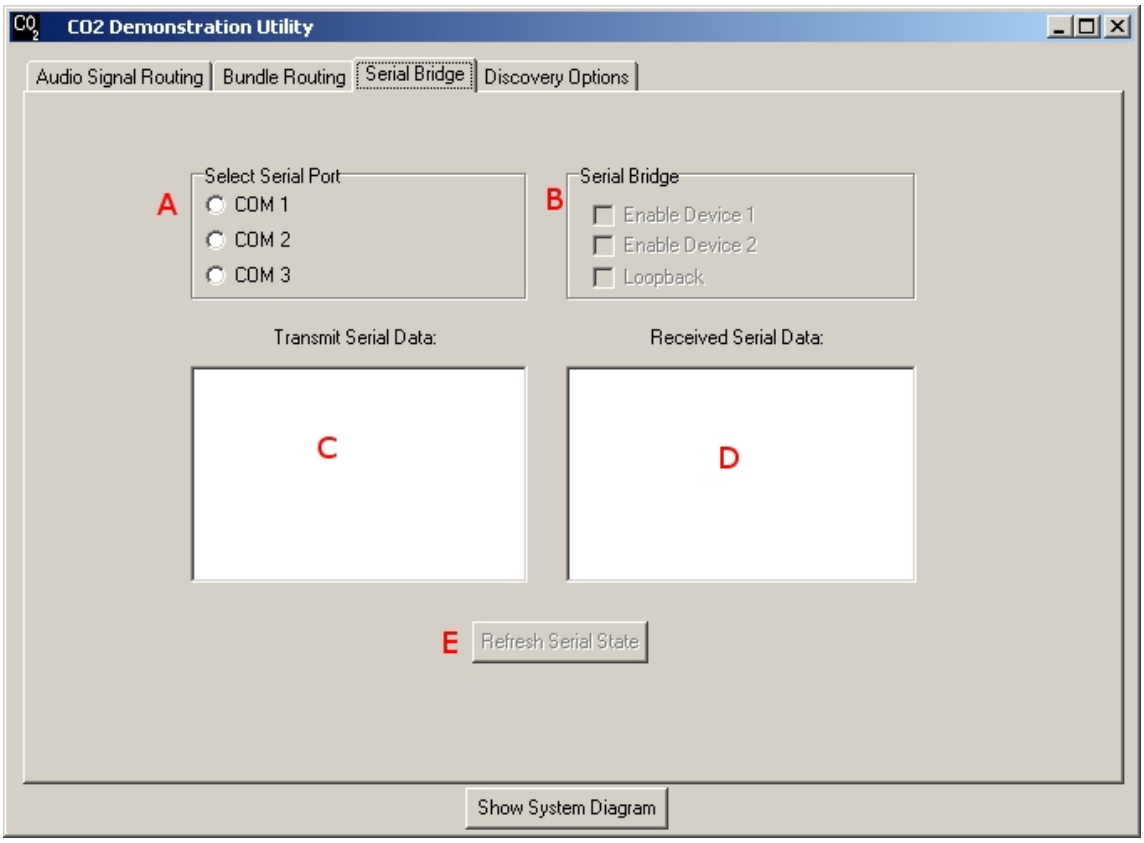


Figure 5 – Serial Bridge page of the CO2 Demonstration utility

A – Serial Port Selection

Users select the serial COM port for their machine by clicking the appropriate selection

B – Serial Bridge

By checking the Enable checkboxes in this section the user is enabling the serial bridge capabilities of each CobraNet device. Both enable checkboxes must be checked for the demonstration to function properly. The loopback checkbox is useful for testing the serial transmission between the computer and the CobraNet device directly connected to the computer.

C – Transmit Serial Data

When the user types characters into this box, the data is transmitted from the computer's serial port through the connected device and to the network. The serial information is then received by the other CobraNet device and echoed back provided that this device is set to loopback operation. The looped back data is then displayed in the Received Serial Data box. By configuring both devices for normal operation, the user can demonstrate the ability to send serial data over the CobraNet network by means of the serial packet bridge feature.

D – Received Serial Data

Characters received on the serial port are displayed in this box.

E – Refresh Serial State Button

This button updates the user interface to reflect the current state of the serial mode on the device. This feature is much like the "Refresh" feature on the Bundle Routing page and should only be necessary if a device has inadvertently been disconnected and reconnected to the network.

3.4.4 – Discovery Options

Devices are automatically discovered by the application; however, the appropriate network adapter must be selected for this to work properly. The software defaults to the first network adapter found. If this is not the appropriate Ethernet adapter then no devices will be found. For example, many laptops have both wired and wireless network adapters. If the first adapter enumerated on the system is the wireless adapter, the adapter will not see the CobraNet devices.

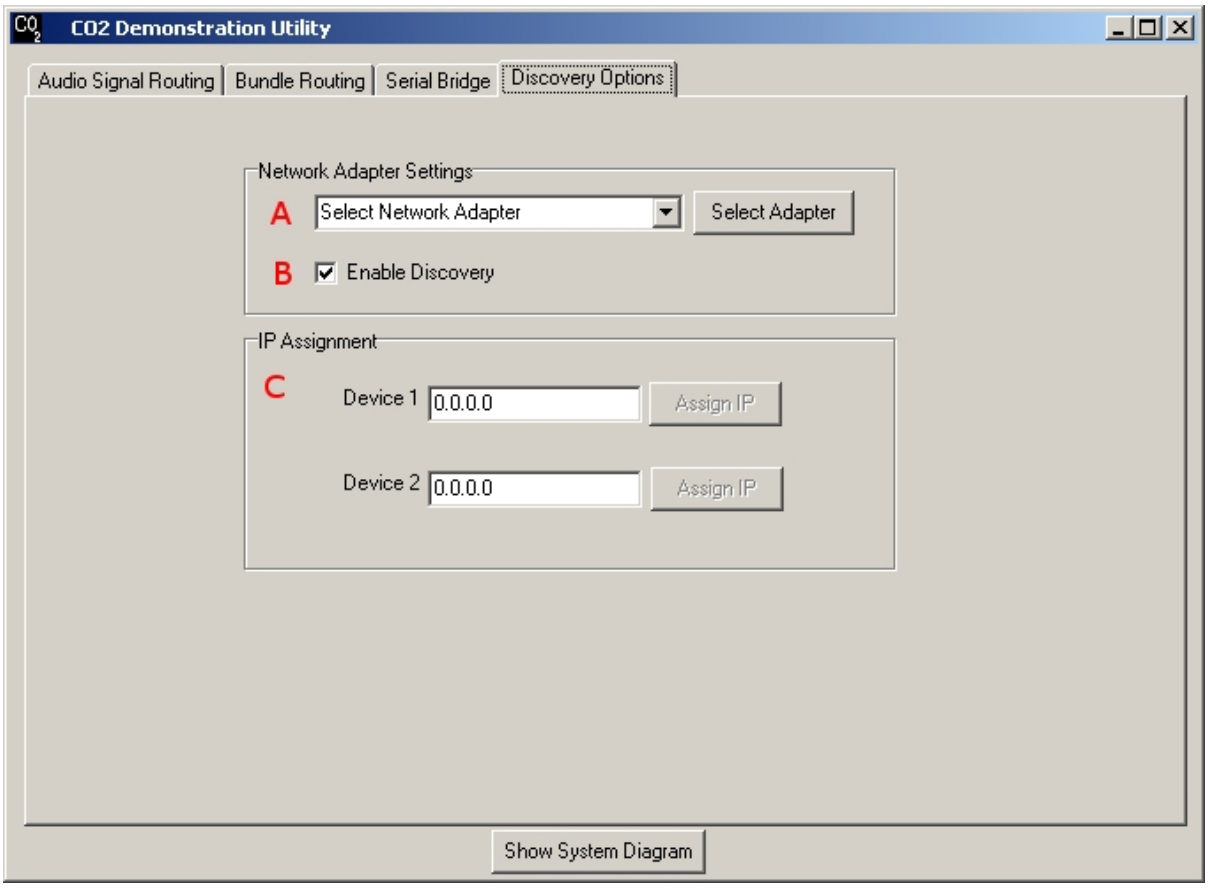


Figure 6 - Discovery Options page of the CO2 Demonstration Utility

A – Network Adapter Settings

Select the appropriate Ethernet adapter from this list. Selection is not active until the Select Adapter button is pressed. If the wrong adapter is selected, CobraNet devices cannot be discovered.

B – Enable Discovery Checkbox

This checkbox allows the user to stop the discovery of devices in the software. This is only for troubleshooting and should remain enabled. By disabling this feature devices are not added or removed from the drop down lists.

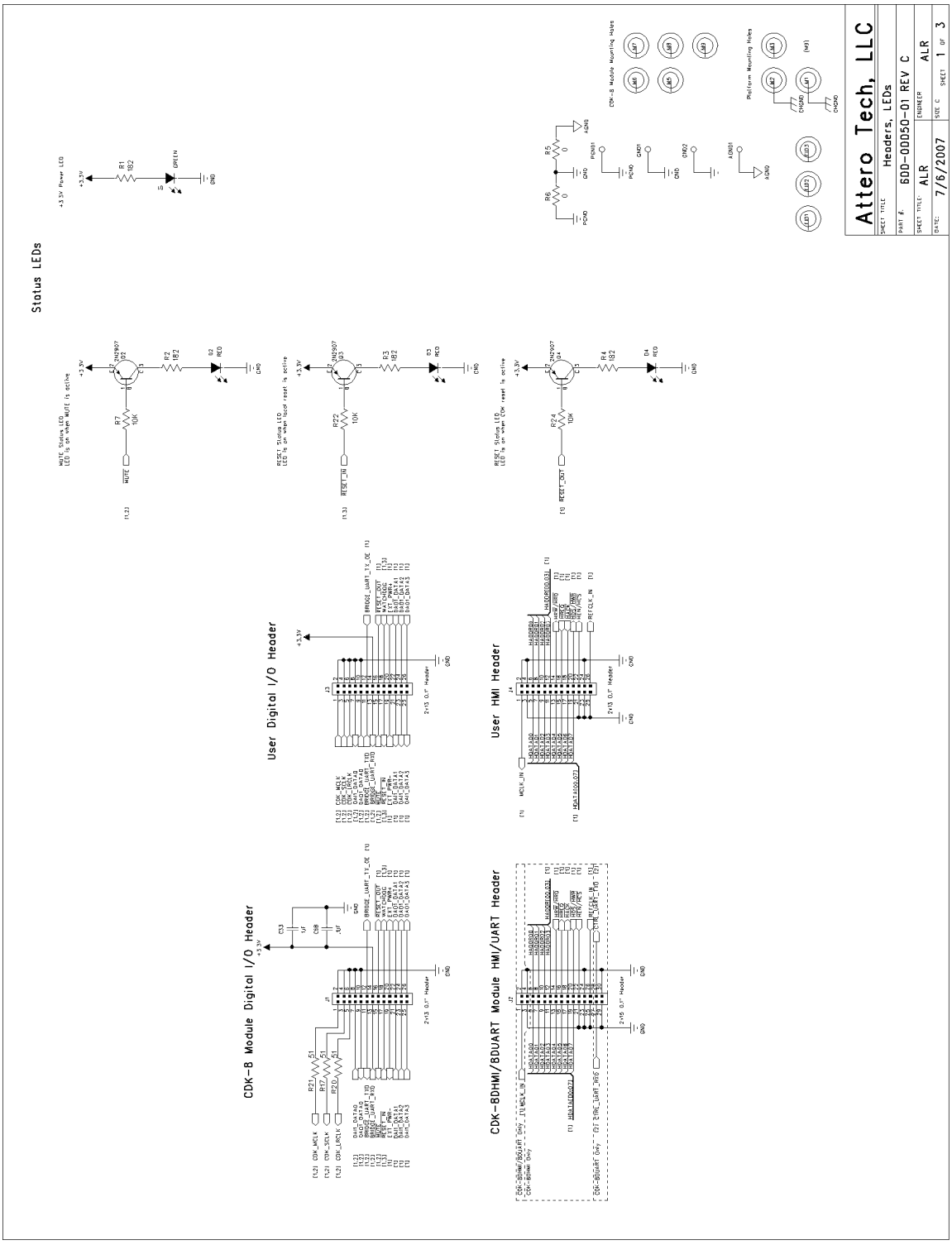
C – Static IP Address Assignment

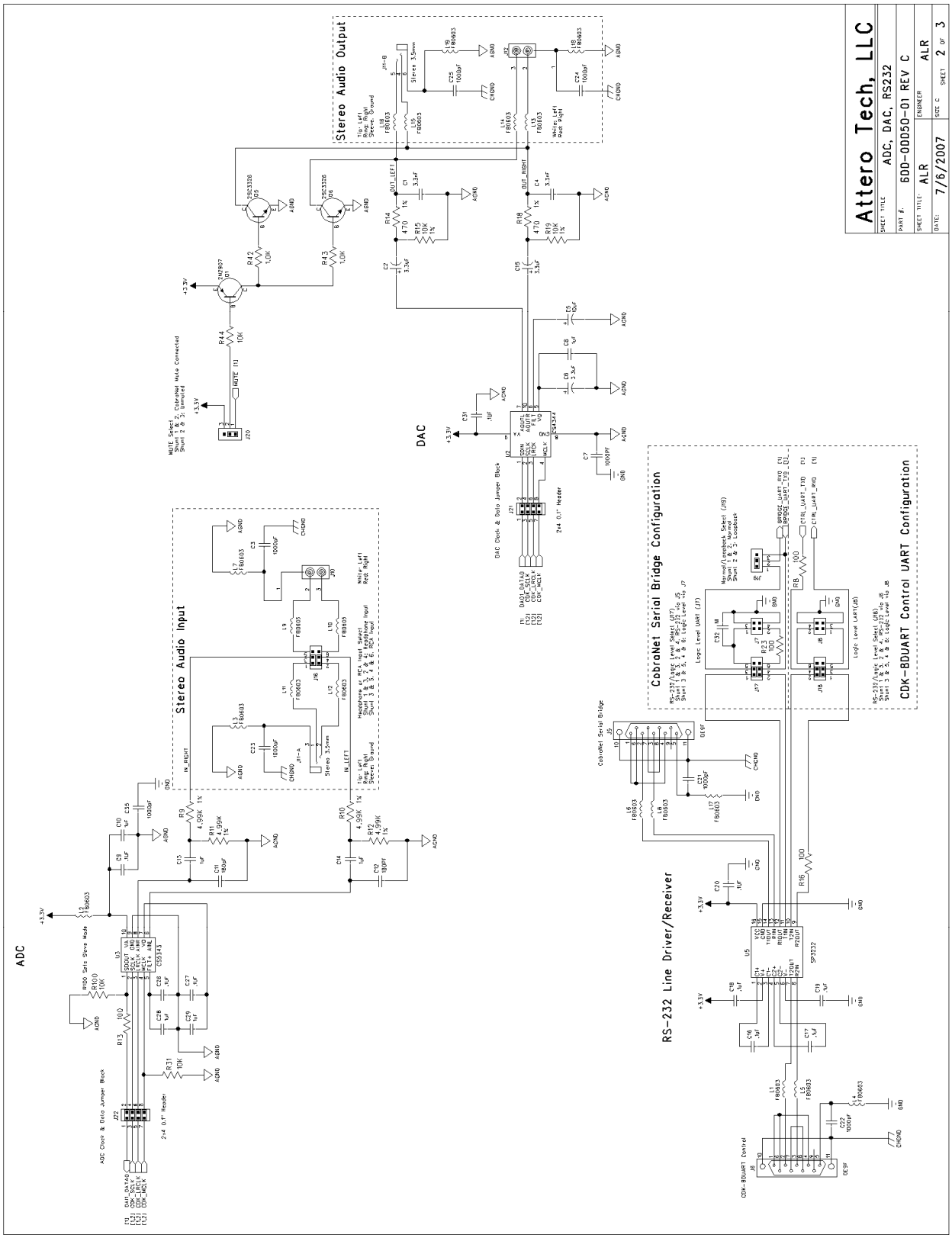
If there is an instance where a unique IP address needs to be assigned to a device, the user can do this here. This is useful if there are other devices on your network using static IP addresses within the range of addresses allowed by auto-assignment. Enter the desired IP address (within the subnet of your network adapter and other CobraNet devices) and click Assign IP.

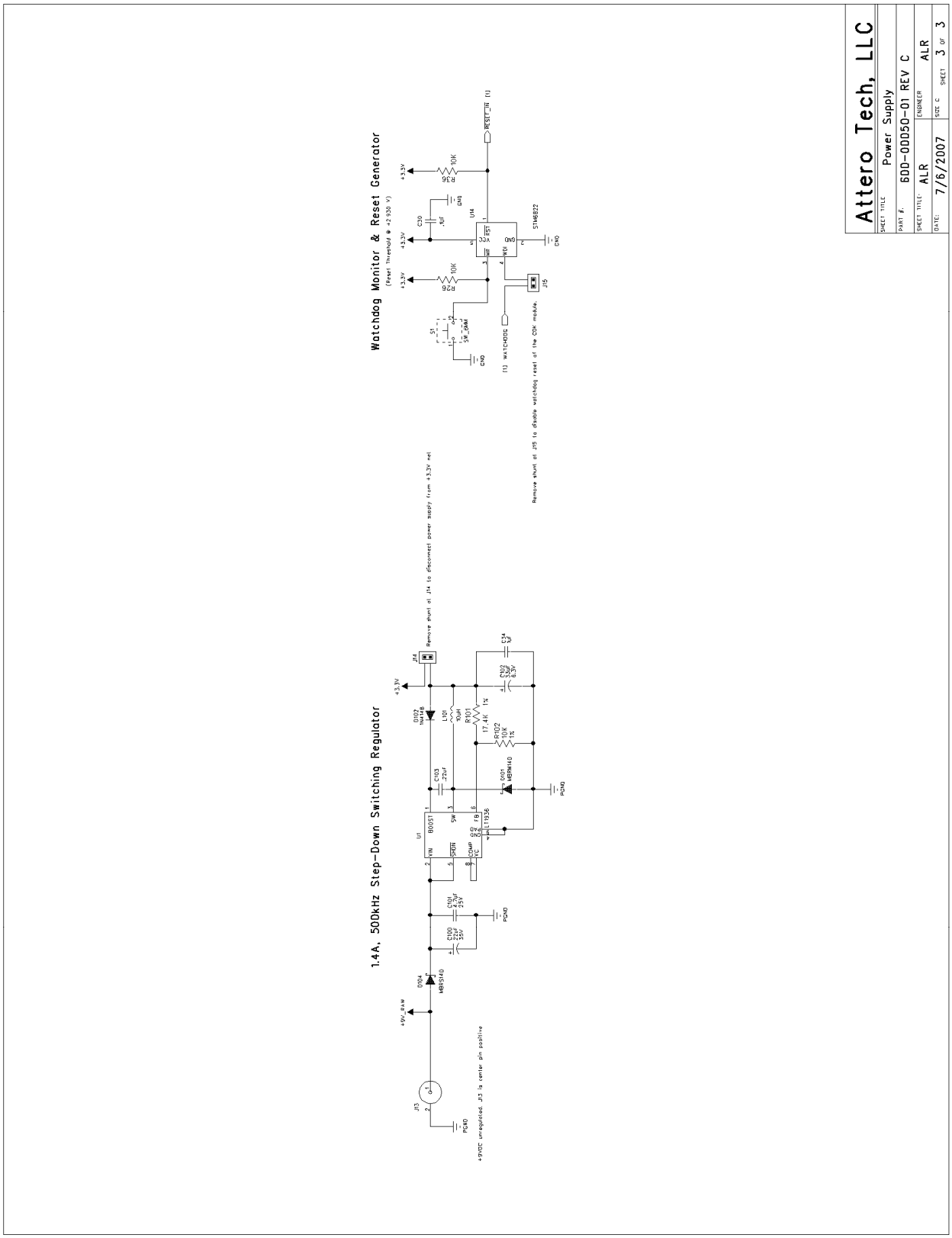
APPENDIX A – Reference Design

A1 – Schematic

The following schematic drawings are subject to change. Contact Attero Tech for latest revision.




Attero Tech, LLC
SHEET TITLE ADC, DAC, RS232
PART #: 600-00050-01 REV C
SHEET TITLE: ALR
ENGINEER ALR
DATE: 7/6/2007
SIZE C SHEET 2 OF 3
Stereo Audio Output
Stereo Audio Input
DAC
ADC
CobraNet Serial Bridge Configuration
CDK-8DUART Control UART Configuration
RS-232 Line Driver/Receiver


Attero Tech, LLC
SHEET TITLE: Power Supply
PART #: 600-00050-01 REV C
SHEET TITLE: ALR
ENGINEER: ALR
DATE: 7/6/2007
SIZE: C
SHEET 3 OF 3
Watchdog Monitor & Reset Generator
(Reset Threshold @ +2.930 V)
1.4A, 500kHz Step-Down Switching Regulator
Remove shunt on J14 to disconnect power supply from +3.3V net
Remove shunt on J15 to disable watchdog reset of the CDK module.
+9V_RAW unregulated. J13 is center pin positive
[1] WATCHDOG
RESET_IN [1]
+3.3V
PGND
STM6822
SW_DAM
MBRM140
MBRS340
LT1936
BOOST
U1
U4
J13
J14
J15
J16

A2 – Bill of Materials

The following Bill of Materials is subject to change. Contact Attero Tech for latest revision.

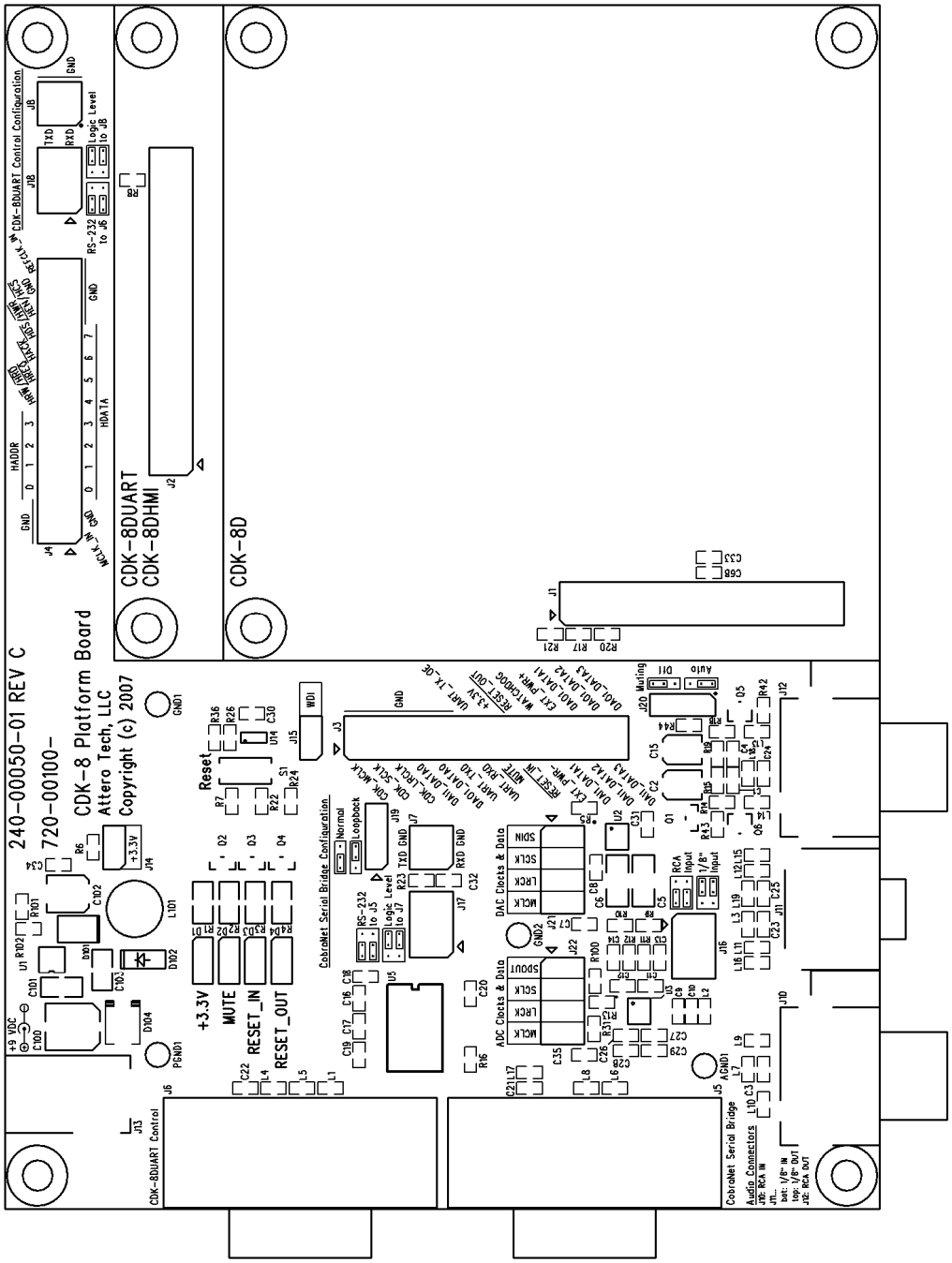
Qty	Reference	Manufacturer	Description	Part Number
8	C3 C7 C21 C22 C23 C24 C25 C35	PANASONIC	CAP, 1000PF, 50V, 0603, 10%	ECJ-1VB1H102K
1	C5	PANASONIC	CAP, 10UF, 25V, 1206, 20%	ECJ-3YB1E106M
2	C11 C12	PANASONIC	CAP, 180PF, 50V, 5%, 0603	ECJ-1VC1H181J
7	C10 C13 C14 C28 C29 C33 C34	PANASONIC	CAP, 1UF, 16V, 10%, 0603	ECJ-1VB1C105K
1	C100	PANASONIC	CAP, 22UF, 35V, 20%, SMT C	EEE-1VA220WR
1	C102	PANASONIC	CAP, 33UF, 6.3V, ELECT, SMD C	EEE-0JA330WR
1	C6	PANASONIC	CAP, 3.3UF,10V, 10%, 1206	ECJ-3YB1A335K
2	C2 C15	PANASONIC	CAP, 3.3UF, 35V, 20%, SMT A	EEE-1VS3R3SR
2	C1 C4	PANASONIC	CAP, 3300PF, 50V, 10%, 0603	ECJ-1VB1H332K
1	C101	PANASONIC	CAP, 4.7UF, 25V, 20%, 0805	ECJ-2FB1E475M
5	C8 C16 C17 C18 C19	PANASONIC	CAP, .1UF, 25V, 10%, 0603	ECJ-1VB1E104K
7	C9 C20 C26 C27 C30 C31 C68	PANASONIC	CAP, .1UF, 25V, +80%/-20%, 0603	ECJ-1VF1E104Z
1	C103	PANASONIC	CAP, .22UF, 25V, 10%, 0805	ECJ-2YB1E224K
1	C32		CAP, NOT INSTALLED	
1	D102	DIODES INC	DIODE, SWT, 100V, 300MA, SOD123	1N4148W-7-F
1	D101	ON SEMI	DIODE, SCHOTTKY, 40V, 1A, POWERMITE	MBRM140T1G
1	D104	ON SEMI	DIODE, SCHOTTKY, 40V, 1A, SMB	MBRS140T3G
1	D1	PANASONIC	LED, SMT, 3216, GREEN	LN1351CTR
3	D2 D3 D4	PANASONIC	LED, SMT, 3216, RED, 2.8V	LN1251CTR
4	AGND1 GND1 GND2 PGND1	SAMTEC	HEADER, 1X1, .1 GROUND POINT	TSW-101-07-G-S
1	J11	CUI INC	CON, AUDIO JACK 3.5MM PCBMT,DUAL VERT	SJD-3510-33
2	J5 J6	AMP	CON, DB9, FEMALE, RA, W/BD-LOCK, S-LOCK	5747844-6
1	J13	CUI STACK	CON, PWR JACK, 2.1MM PCB	PJ-202A
2	J10 J12	KOBICONN	CON, RCA, 1X2, VERT, RED/WHITE	161-4219-E
2	J14 J15	SAMTEC	HEADER, 1X2 PIN, .1"	TSW-102-07-G-S
2	J19 J20	SAMTEC	HEADER, 1X3, 0.1 THRU	TSW-103-07-G-S
3	J3 J4	SAMTEC	HEADER, 2X13, .1, THRU	TSW-113-07-G-D
1	J1	SAMTEC	HEADER, 2X13, .1, THRU, LOW PROFILE	MTLW-113-07-G-D-230
1	J2	SAMTEC	HEADER, 2X15, 0.1", THRU, LOW PROFILE	MTLW-115-07-G-D-230
2	J7 J8	SAMTEC	HEADER, 2X2, 0.1", THRU, MALE	TSW-102-07-G-D

3	J16 J17 J18	SAMTEC	HEADER, 2X3, .1, THRU, MALE	TSW-103-07-G-D
2	J21 J22	SAMTEC	HEADER, 2X4, 0.1", THRU, MALE	TSW-104-07-G-D
1	L101	SUMIDA	INDUCTOR, POWER, 10UH, 2.0A, SMD	CDRH6D38NP-100NC
19	L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11 L12 L13 L14 L15 L16 L17 L18 L19	STEWARD	FERRITE, 68_OHM, 1A, 0603	MI0603J680R-10
2	Q5 Q6	TOSHIBA	TRAN, SIG, NPN, 20 V, SOT23	2SC3326A(T5LFT)
4	Q1 Q2 Q3 Q4	ON SEMI	TRAN, SIG, PNP, 60V, SOT-23	MMBT2907ALT1G
2	R5 R6	PANASONIC	RES, 0 OHM, 1/10W, 5%, 0603	ERJ-3GEY0R00V
2	R42 R43	PANASONIC	RES, 1.0K, 1/10W, 5%, 0603	ERJ-3GEYJ102V
4	R8 R13 R16 R23	PANASONIC	RES, 100 OHM, 1/10W, 5%, 0603	ERJ-3GEYJ101V
3	R15 R19 R102	PANASONIC	RES, 10K, 1/10W, 1%, 0603	ERJ-3EKF1002V
8	R7 R22 R24 R26 R31 R36 R44 R100	PANASONIC	RES, 10K, 1/10W, 5%, 0603	ERJ-3GEYJ103V
1	R101	PANASONIC	RES, 17.4K, 1/10W, 1%, 0603	ERJ-3EKF1742V
4	R1 R2 R3 R4	PANASONIC	RES, 182 OHM, 1/8W, 1%, 0805	ERJ-6ENF1820V
2	R14 R18	ROHM	RES, 470, 1/10W, 0603, 1%	MCR03EZPFX4700
4	R9 R10 R11 R12	PANASONIC	RES, 4.99K, 1/10W, 1%, 0603	ERJ-3EKF4991V
3	R17 R20 R21	ROHM	RES, 51 OHM, 1/10W, 1%, 0603	MCR03EZPFX51R0
1	S1	PANASONIC	SWITCH, TACT, 2LEAD 3X6MM	EVQ-PJS04K
1	U2	CIRRUS LOGIC	IC MXS, STEREO DAC, TSSOP10	CS4344-CZZ
1	U3	CIRRUS LOGIC	IC MXS, A/D CONVERT, 10 TSSOP	CS5343-CZZ
1	U1	LINEAR TECH	IC LNR, REG, SW, 1.4A, 8-MSOP	LT1936EMS8E#PBF
1	U5	SIPEX	IC DIG, DUAL RS232, 3.3 V, WSOIC16	SP3232ECT-L
1	U14	ST MICRO	IC DIG, MPU SUPERVISR 2.930V, SOT23-5	STM6822SWY6F
18		KOBICONN	SHORTING JUMPER, BLACK	151-8000-E
1		ATTERO TECH	PCB, CDK-8 Platform Board	240-00050-01-C
1		ATTERO TECH	SCHEMATIC, CDK-8 Platform Board	600-00050-01-C

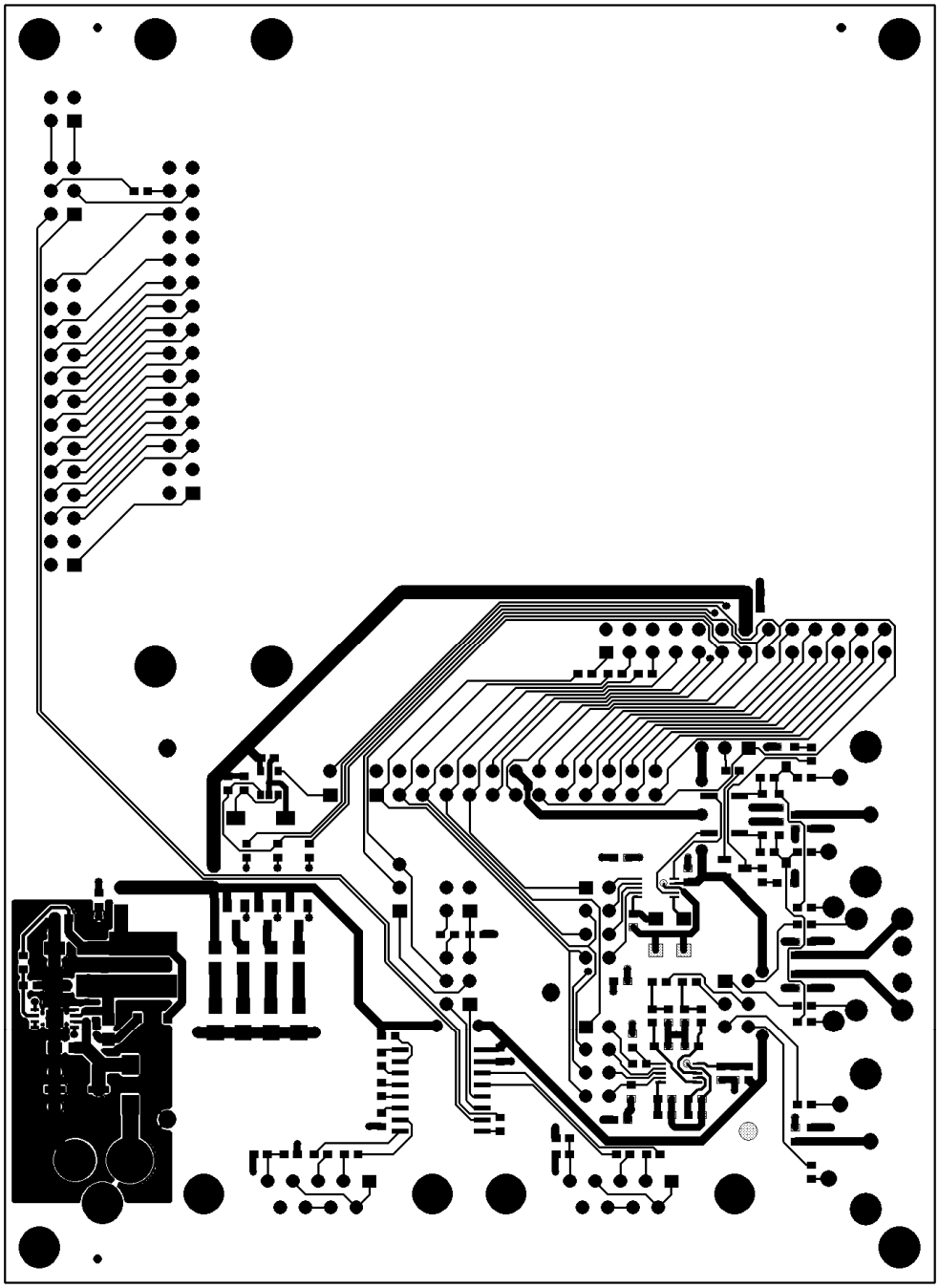
A3 – PCB

The following PCB drawings are subject to change. Contact Attero Tech for latest revision.

A3.1 – Top Silkscreen

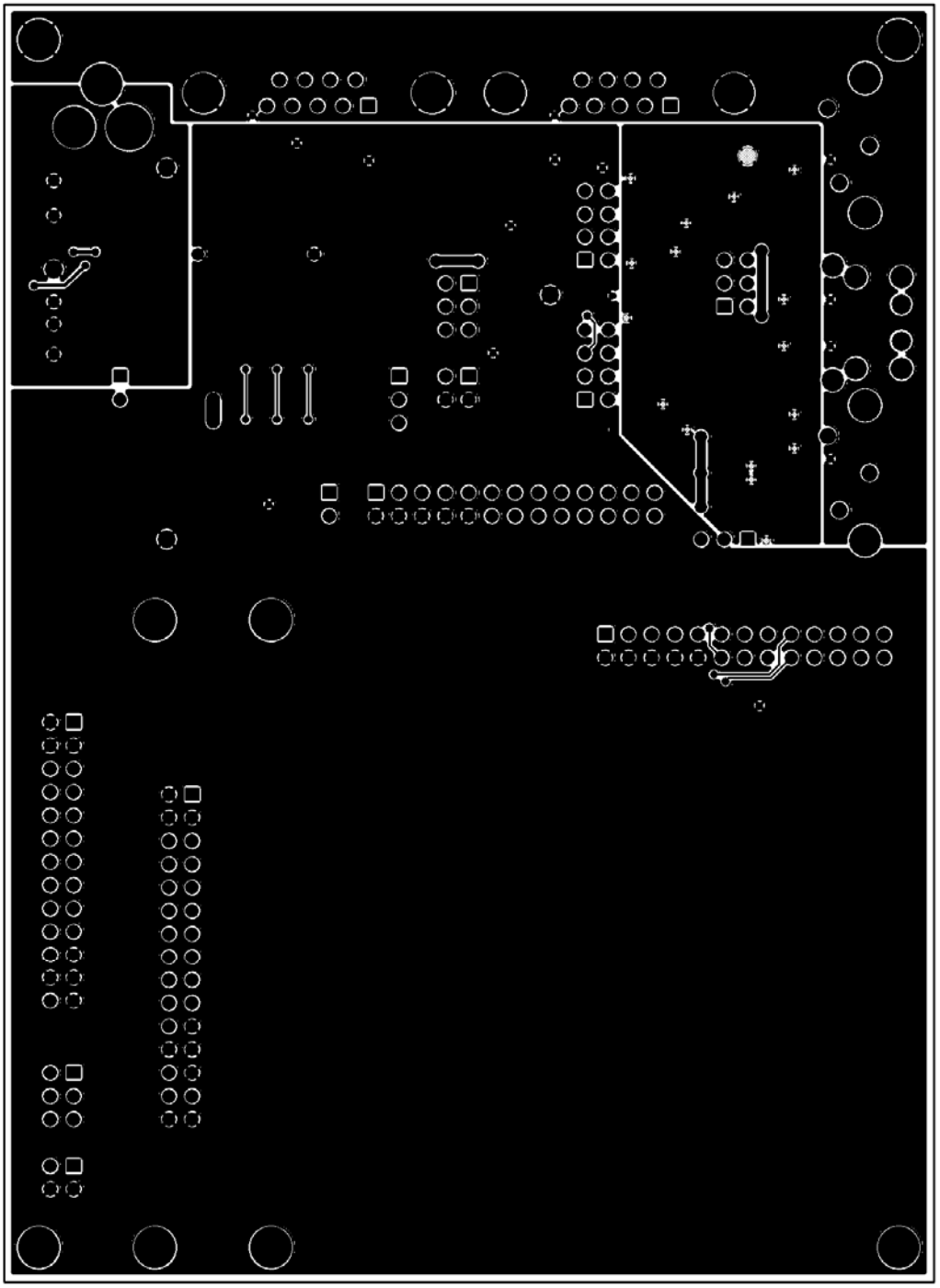


A3.2 – Top Copper



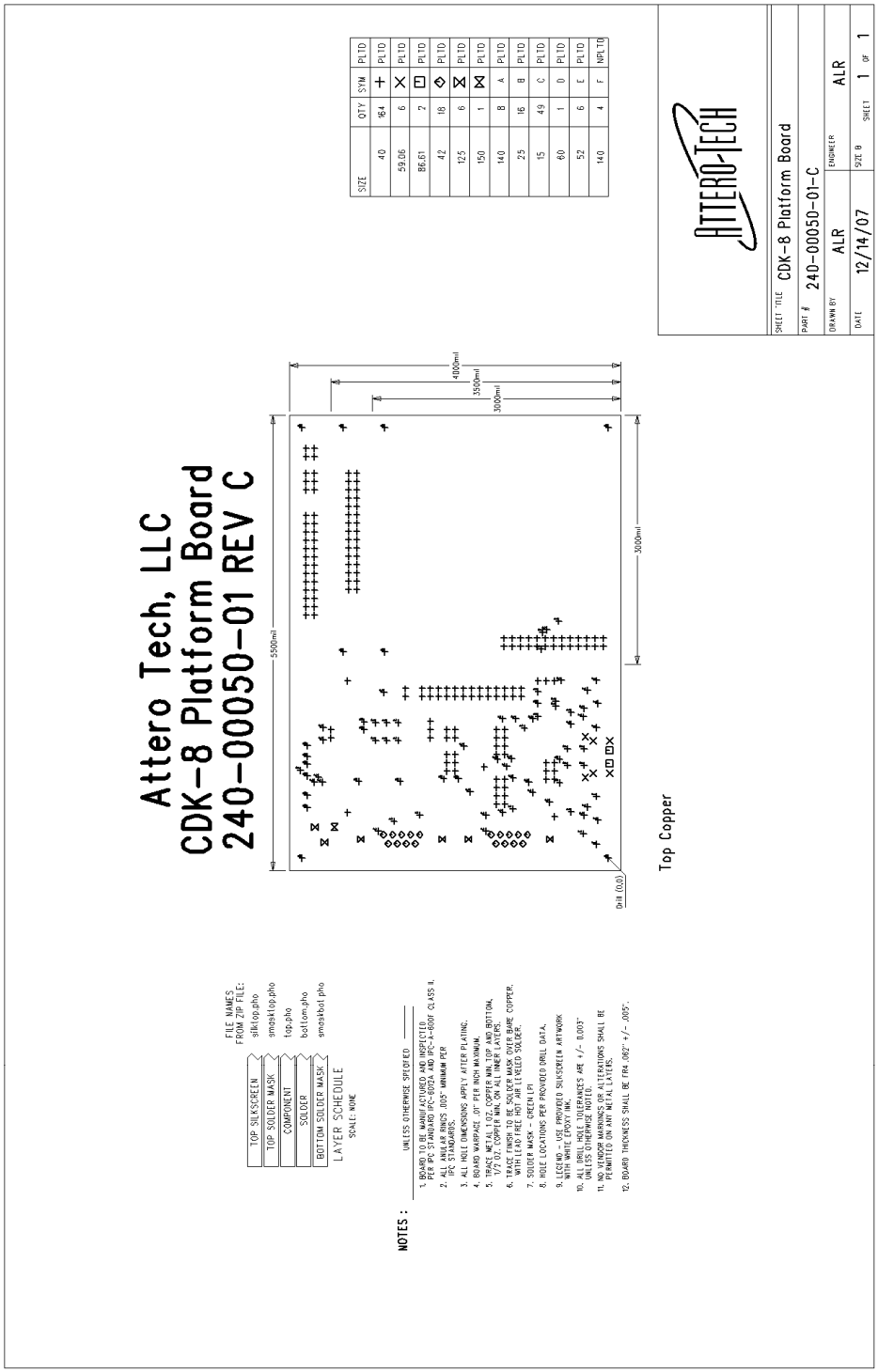
Top Copper

A3.3 – Bottom Copper



Bottom Copper

A3.4 – Assembly Drawing


Attero Tech, LLC
CDK-8 Platform Board
240-00050-01 REV C
Top Copper
NOTES :
UNLESS OTHERWISE SPECIFIED
1. BOARD TO BE MANUFACTURED AND INSPECTED PER IPC-6012A WITH IPC-600A AND IPC-A-600H CLASS A.
2. ALL ANNULAR RINGS .005" MINIMUM PER IPC STANDARDS.
3. ALL HOLE DIMENSIONS APPLY AFTER PLATING.
4. BOARD WARPAGE .01" PER INCH MAXIMUM.
5. TRACE METALLIZE COPPER MIN TOP AND BOTTOM, 1 OZ. COPPER MIN ALL INNER LAYERS.
6. TRACE FINISH TO BE SOLDER MASK OVER BARE COPPER, WITH LEAD FREE HOT AIR LEVELED SOLDER.
7. SOLDER MASK – GREEN LPI
8. HOLE LOCATIONS PER PROVIDED DRILL DATA.
9. LEGEND – USE PROVIDED SILKSCREEN ARTWORK WITH WHITE EPOXY INK.
10. ALL DRILL HOLE TOLERANCES ARE +/- 0.003" UNLESS OTHERWISE NOTED.
11. NO VENDOR MARKINGS OR ALTERATIONS SHALL BE PERMITTED ON ANY METAL LAYERS.
12. BOARD THICKNESS SHALL BE FR4 .062" +/- .005".
LAYER SCHEDULE
SCALE: NONE
TOP SILKSCREEN
TOP SOLDER MASK
COMPONENT
SOLDER
BOTTOM SOLDER MASK
FILE NAMES FROM ZIP FILE:
silktop.pho
smasktop.pho
top.pho
bottom.pho
smaskbot.pho
SIZE QTY SYM PLTD
40 164 + PLTD
59.06 6 X PLTD
86.61 7 PLTD
42 18 PLTD
125 6 PLTD
150 1 PLTD
140 8 A PLTD
25 16 B PLTD
15 49 C PLTD
60 1 D PLTD
52 6 E PLTD
140 4 F NPLTD
5500mil
4100mil
3500mil
3000mil
Drill (0.03)
ATTERO-TECH
SHEET TITLE CDK-8 Platform Board
PART # 240-00050-01-C
DRAWN BY ALR
ENGINEER ALR
DATE 12/14/07
SIZE B
SHEET 1 OF 1

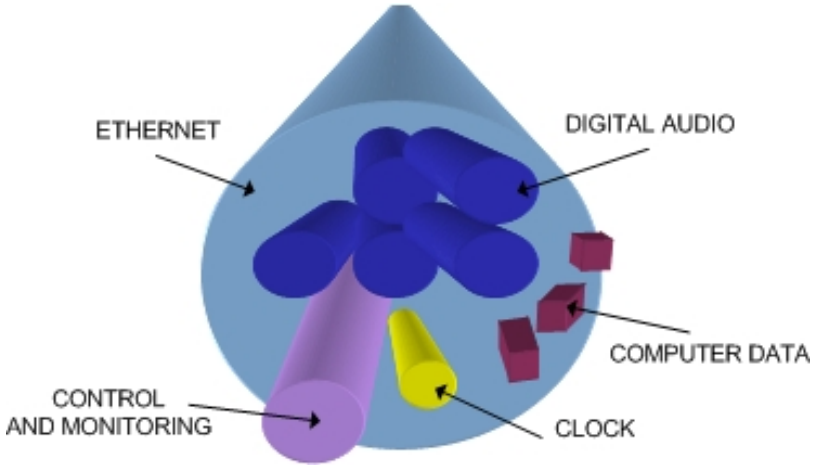
APPENDIX B – Introduction to CobraNet

CobraNet is an audio networking technology for delivery and distribution of real-time, high quality, uncompressed digital audio using a standard Ethernet network. It is implemented using a combination of hardware, firmware, and the CobraNet protocol.

Unlike other audio networking or distribution technologies, CobraNet is a true network and exists on standard Ethernet networks using standard Ethernet hardware. Since it is a true network, audio routing is highly flexible between network nodes and can be used in a variety of audio distribution applications.

In addition to the high degree of routing flexibility that CobraNet provides, the technology also incorporates the ability to monitor and control CobraNet devices remotely. This is a key feature that is highly important in fixed installation applications where the audio distribution equipment may not be readily accessible. All CobraNet devices on the network can be controlled and monitored from a central location by sending control commands and monitoring device specific parameters.

CobraNet provides this capability by implementing Simple Network Management Protocol (SNMP). SNMP is a standard protocol typically used for monitoring network devices such as Ethernet switches. In the case of CobraNet, it allows users to communicate with any CobraNet device using standard SNMP tools or a customized user interface designed specifically for CobraNet, such as Attero Tech's Control Center application.



The figure above represents the types of data that coexist on a CobraNet network.

Before a CobraNet system can be configured, it is important to first understand how CobraNet distributes audio between devices.

Audio is sent in "bundles" on a CobraNet system. Each bundle is capable of holding up to 8 logical audio channels. Every CobraNet device has a number of bundle transmitters and bundle receivers. These transmitters and receivers are the mechanism used to send and receive bundles between devices.

For a transmitted bundle, audio may be sourced either directly from the local audio inputs of the device or from internal audio via the on-board DSP[1], but not both simultaneously. Internal audio from the onboard DSP could have originally been sourced from the local device inputs, sent from another CobraNet device or even generated by the DSP itself. Combinations of the local or internal audio may exist within a bundle in any order. Additionally, a single audio source in a device may be used multiple times in a single transmitter bundle or across multiple transmitter bundles.

For a received bundle, the received network audio may be routed directly to the device's local outputs, the internal DSP[1] or simply ignored.

Once the contents of a bundle have been decided, the next step is to pass the bundle to another CobraNet device. To do this, every CobraNet device has up to 4 bundle transmitters. Each bundle transmitter has a transmit mode that must first be selected. This affects how many devices may receive that particular bundle at a time.

[1] Not available on all devices – CS496xxx devices only

The modes are as follows:

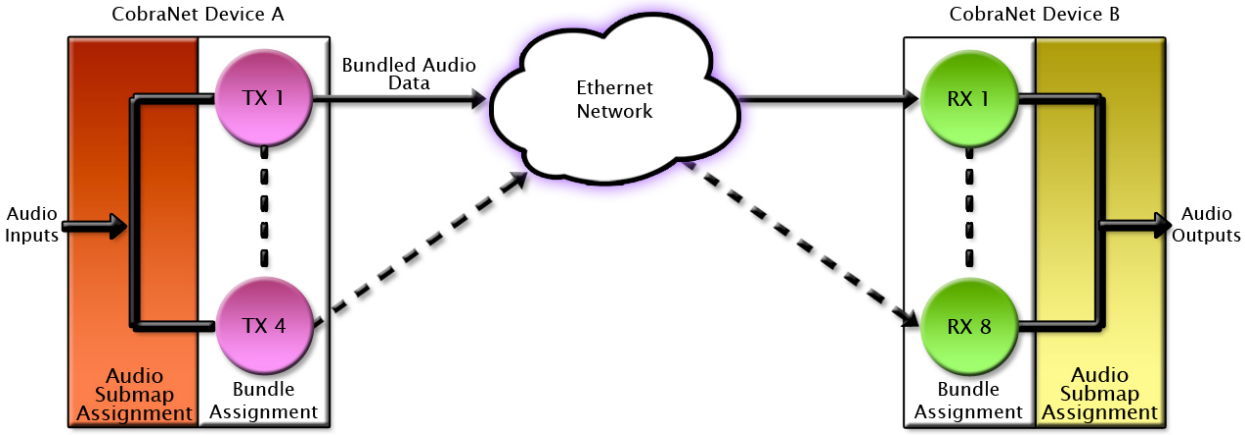
- Unicast – Used for one-to-one connections. In this mode, only one receiver at a time can receive this bundle. Once a link is established from this transmitted bundle to a receiver, any future requests for that bundle from other potential receivers will fail.

- Multicast – Used for one-to-many connections. This mode broadcasts its contents over the entire network. There is no restriction on the number of receivers. However, the downside is that CobraNet packets are distributed to all nodes on the network, whether they need them or not thus creating possible network bandwidth issues.

- Multi-unicasts – Another one-to-many mode. Whilst this is the most efficient method for getting a bundle to multiple receivers in terms of network bandwidth, it requires more processing power on the CobraNet device so in this mode there is a maximum limit of four receiver connections (this can be reduced if required). If more connections are required than the limit, the node can be configured to automatically switches to multicast.

Note: When a bundle must be transmitted to multiple receivers, multi-unicast transmissions should be used where possible.

Once the mode is selected, to enable a device to transmit the bundle, simply allocate the particular transmitter bundle a non-zero number. Since this number identifies all the network packets sent out by that transmitter, each transmit bundle number must be unique on a network[2].



Now that the transmitter is set up, it is time to set up the receivers. In order to receive bundles, each CobraNet device has up to eight bundle receivers. To enable a device to receive a bundle, simply allocate one of that device's bundle receivers the same bundle number as a transmitted bundle. By doing so, a virtual link is created and audio should now be passed from one device to the other. It should be noted that no knowledge of a device's network topology or connection is thus required in order to configure audio connections. The only restriction to this is that a device cannot be set up to receive a bundle it is also transmitting.

The above case creates a simple, one-to-one, unidirectional link. If more devices are required to receive that bundle, allocate the same transmitted bundle number to a bundle receiver on the other CobraNet devices.

It is also important to note that CobraNet supports simultaneous bidirectional audio distribution in each device. Not only could audio be sent from Device A to Device B but at the same time, should it be needed, audio could also be sent from Device B to Device A. The exact bundle and routing configuration will be determined by the needs of each individual installation. An installation may have multiple units transmitting multiple bundles. The only restriction is the bandwidth available on the network to transfer the audio.

CobraNet does more than just transfer audio data. It can be used to pass serial information as well. A feature called serial bridging has been incorporated that allows the passage of serial data between nodes. Each node can pass serial data to a specific node or multicast the data to multiple nodes. A node can also receive data from either a single source or multiple sources. Baud rates, data bits, stop bits, parity, and so on are all configurable. There is also support for multi-drop serial buses as well.

Finally, CobraNet has the capability to alter all of the above options in real time making the whole system completely dynamic. By use of control software, all of the bundle assignment parameters can be configured with no need to change cables, switch out connectors, or pull new wiring. Most importantly, this control capability can be implemented from a single location!

[2] Bundle numbers range from 1 through 65535. A value of 0 represents an inactive bundle. Numbers 1-255 are reserved for multicast mode transmissions only.

APPENDIX C – Reference Documents

The following table lists the relevant reference documents.

Document Title
CDK-8 Platform Board Quick Start Guide
CDK-8 Datasheet
CobraNet Programmer's Reference (Cirrus Logic)